



RON AHLE

Wetland beauties nurtured by sun and fire thrive in the sandhill seepage bog ecosystem, where unusually high diversity includes rare native plant species and an array of wet-loving wildlife.

PHILLIP JONES

Children of the Seeps

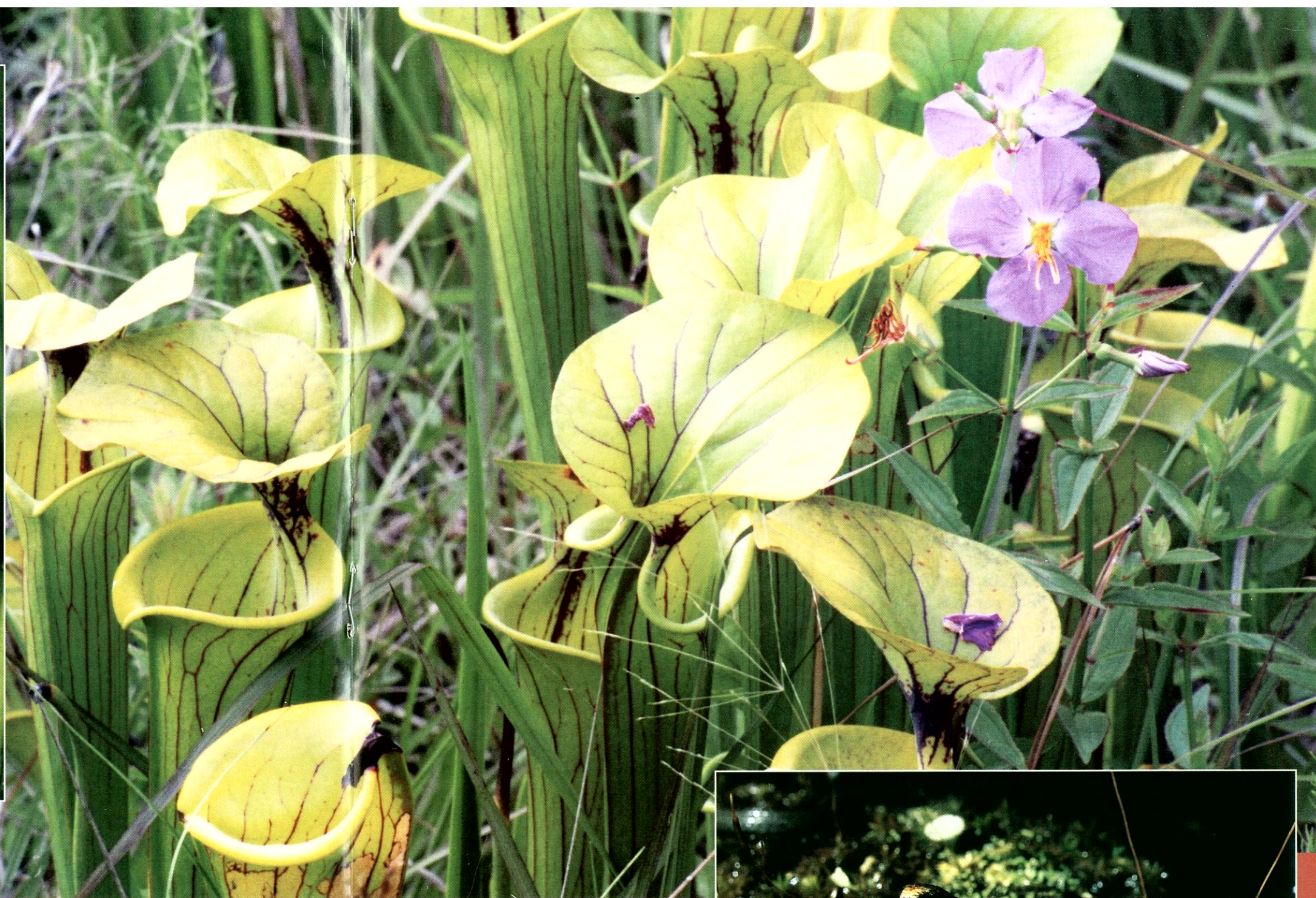
by John Nelson

Careful! Careful! Watch your step—it is as though the soft, wet ground is covered with a sprinkling of bright floral jewelry, scattered liberally from the midsummer sky. There's a glistening sundew. There's a golden-glowing bladderwort. There's a chartreuse patch of pitcher-plants, then a blood-red one. Here is sky-blue salvia and here some snow-white colic-root, pink rosebud orchid, a big patch of crow-poison and clumps of tall, stately hat-pins. There's a patch of fly-poison and a bright purple-pink meadow-beauty. Oh, gosh—see the pine lily over there? And look at the fringed orchids! Hundreds forming a brilliant fire-orange patch next to . . . what's that? Poison sumac!



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Grass-pink orchid.



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A biologist's (and photographer's) paradise, this hillside hosts a tapestry of brilliant, blooming species, through spring, summer and fall, laid out on a nearly treeless background of titi, cinnamon ferns, foxtail clubmoss, sedges and grasses. It's a place where you cannot make a move without stepping on something interesting. (You might see any number of interesting critters here, too, including an indigo snake or perhaps a pine-barrens tree frog.) Part the grassy fibers of this carpet and look down below to the place where lush sphagnum moss forms a soft, flat cushion

everywhere below the ferns. Here and there may be a charcoal-covered snag or stump of an incinerated tree. How could such a damp place ever start to burn? (Look out on the horizon. There's a big thunderstorm looming, and the lightning is already popping.)

Not only midsummer but also autumn brings a new suite of brilliant bloomers here: sunflowers, Joe-pye-weed and goldenrod, to name a few.

This is a sandhill seepage bog, or seep, for short. These are fascinating, naturally occurring plant communities on hillside slopes that may harbor, for

Yellow pitcher-plants and meadow-beauties (above). Right, redbelly snake and squirrel treefrog. Previous pages: Carolina Sandhills National Wildlife Refuge; sundews.



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their size, the greatest plant diversity in the Southeast. These places are special also because they are very uncommon, and any sizeable examples in good natural shape are painfully rare.

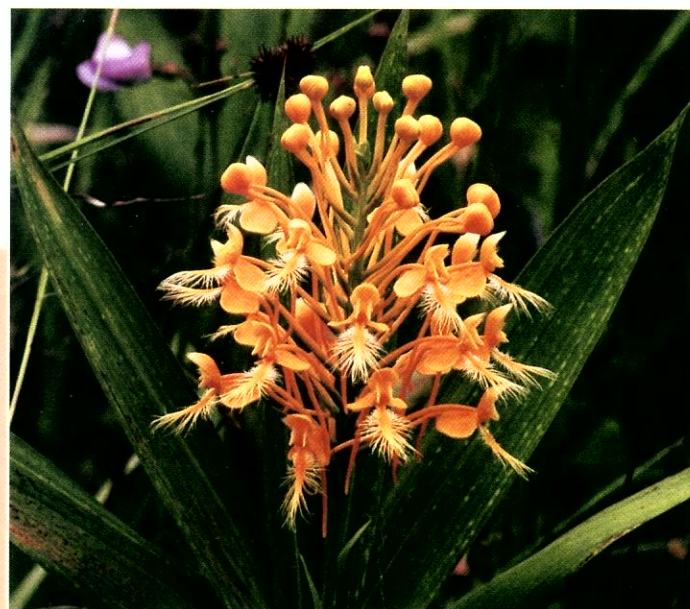
Sandhill seeps have for years piqued the curiosity of botanists and other plant enthusiasts in our area, often featuring impressive arrays of carnivorous species (all of the local genera, except for Venus' fly trap, which would only be found naturally in certain Carolina bays along the coast), including spectacular stands of pitcher-plants. Three pitcher-plant species are most likely in the seeps: yellow, red and purple.

In the Southern states, seeping bog systems on sandy substrates have historically occurred only in the fall-line sandhills, with a few exceptions in other parts of the coastal plain counties. They all have two things in common: similar hydrology and a recurring fire history.

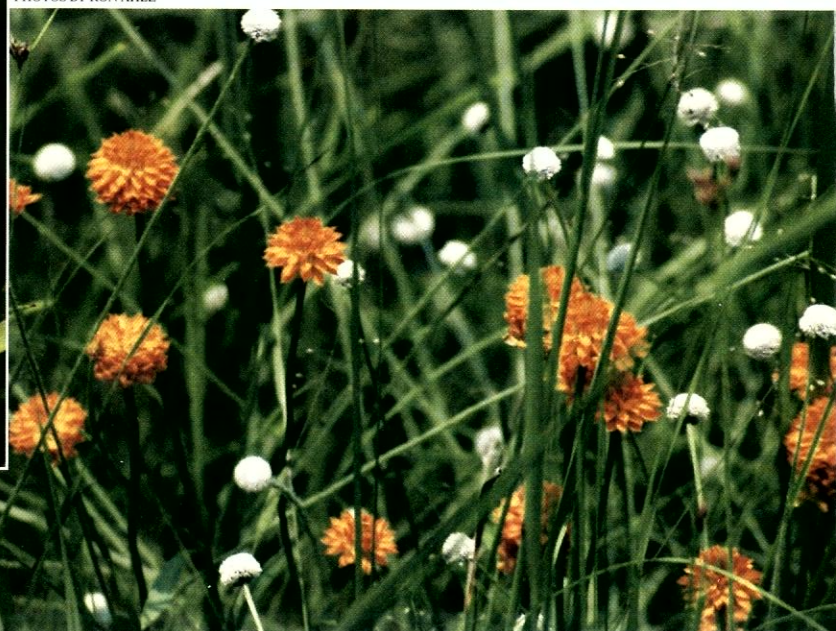
Rainwater in the sandhills doesn't remain at the surface long. It trickles quickly through the sand until it reaches an impenetrable layer, usually clay, which forces it to move laterally. At places on a sandhill slope where the clay layer meets the surface, the water, sometimes in considerable quantities, will reach the surface. The water oozes, drips or seeps from these places, ultimately collecting in the upper ends of clear blackwater sandhill streams. Sandhill seeps provide boggy places where special vegetation may capitalize on wet conditions in an otherwise dry ecosystem. Because of the irregular ways in which sand, clay layers and rainfall interact, these seepages vary greatly in size and



Yellow pitcher-plants.



PHOTOS BY RON AHLE



shape. Some are only a foot or so across, while others may stretch for several acres.

The ground below is not pure sand, though. In such habitats, and after thousands of years of organic matter buildup, significant amounts of peat (partly decayed, moisture-absorbing plant matter often found in bogs and swamps) may occur. It is usually easy to find evidence of past fires, as well, in the form of charcoal.

Well-developed sandhill seeps offer habitat for the sun-worshippers of the plant world; practically all the species in these habitats demand maximum exposure and cannot tolerate shade. A sun-drenched site such as this provides perfect habitat for wetland inhabitants. Without the sunlight, though, there is no diversity.

Fire is the other absolute determinant for the development of a diverse seepage bog. Recurring natural fires, caused by lightning (or in the past by Native Americans), would effectively remove most of the woody vegetation—trees and large shrubs—that would eventually shade out their shorter neighbors. Small seeps in which fires are excluded fill up rather rapidly with a succession of shrubs, then red maples, sweet gums, yellow poplars and pines, and eventually the open aspect of the seep is lost, along with whatever original herbaceous diversity may have been present.

In the Palmetto State, very few examples of these extremely delicate habitats exist. Fortunately, the two largest known seeps in the sandhills occur on protected land, and both are managed with fire. Oxpen Lake bog, in Chesterfield County, lies within the Carolina Sandhills National Wildlife Refuge. Buffalo Creek bog, the larger of the two, is wholly confined to Fort Jackson Army installation, near Columbia. Smaller examples are scattered from Cheraw to Aiken. Because of the fragile nature of these sites, scientists wish to keep their exact locations secret.

The seep at Buffalo Creek is truly magical. In the early 1990s, a team of botanists from the University of South Carolina's herbarium initially surveyed this site as a part of a large-scale inventory of Fort Jackson property, a study developed through The Nature Conservancy of South Carolina. This survey established the existence of an extraordinarily diverse habitat,

Fringed orchid, far left; hat-pins and orange milkwort, near left. Right, cinnamon fern and yellow pitcher-plant.

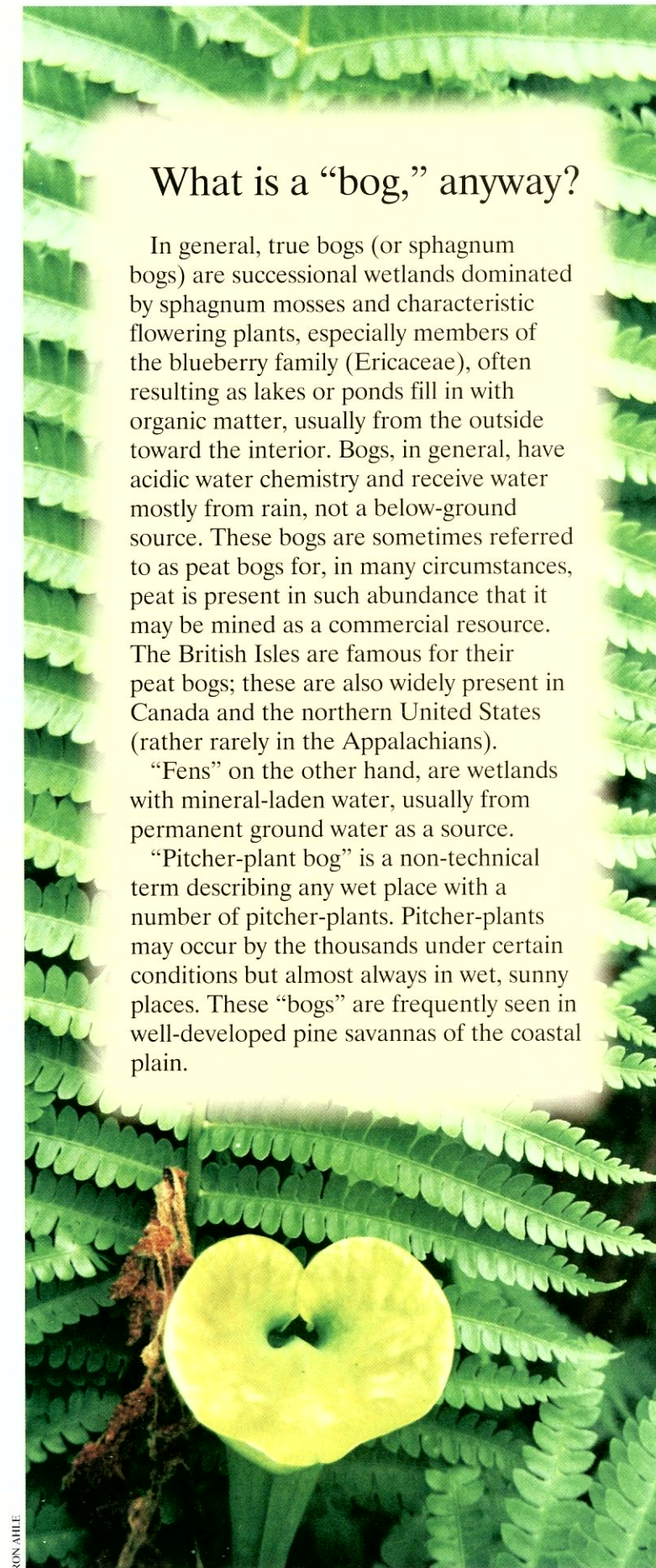
What is a "bog," anyway?

In general, true bogs (or sphagnum bogs) are successional wetlands dominated by sphagnum mosses and characteristic flowering plants, especially members of the blueberry family (Ericaceae), often resulting as lakes or ponds fill in with organic matter, usually from the outside toward the interior. Bogs, in general, have acidic water chemistry and receive water mostly from rain, not a below-ground source. These bogs are sometimes referred to as peat bogs for, in many circumstances, peat is present in such abundance that it may be mined as a commercial resource. The British Isles are famous for their peat bogs; these are also widely present in Canada and the northern United States (rather rarely in the Appalachians).

"Fens" on the other hand, are wetlands with mineral-laden water, usually from permanent ground water as a source.

"Pitcher-plant bog" is a non-technical term describing any wet place with a number of pitcher-plants. Pitcher-plants may occur by the thousands under certain conditions but almost always in wet, sunny places. These "bogs" are frequently seen in well-developed pine savannas of the coastal plain.

RON AHLE



*Plants listed in the article, with
scientific names*

Titi *Cyrilla racemiflora*
Sweet bay *Magnolia virginiana*
Poison sumac *Toxicodendron vernix*
Foxtail clubmoss *Lycopodiella alopecuroides*
Fringed orchid *Platanthera ciliaris*
Cinnamon fern *Osmunda cinnamomea*
Rosebud orchid *Cleistes divaricata*
Salvia *Salvia integrifolia*
Crow-poison *Zigadenus glaberrimus*
Royal fern *Osmunda regalis* var. *spectabilis*
Yellow pitcher-plant *Sarracenia flava*
Red pitcher-plant *Sarracenia rubra*
Grass-pink orchid *Calopogon tuberosus*
Mountain sweet pitcher-plant *Sarracenia rubra* ssp. *jonesii*
Purple pitcher-plant *Sarracenia purpurea*
Whorled loosestrife *Lysimachia asperulaefolia*
Fire lily or fire-bog lily *Lilium pyrophilum*
Meadow-beauty *Rhexia virginica*, *R. alifanus*
Sundew *Drosera brevifolia*, *D. capillaris*, *D. intermedia*
Bladderwort *Utricularia cornuta*, *U. juncea*
Fly-poison *Amianthium muscaetoxicum*
Colic-root *Aletris farinosa*
Pine lily *Lilium catesbaei*
Goldenrod *Solidago canadensis*
Sunflower *Helianthus angustifolius*, *H. atrorubens*
Venus' fly trap *Dionaea muscipula*
Hat-pins *Lachnocaulon anceps*
Joe-pye-weed *Eupatorium maculatum*

PHOTOS BY RON AHLE

Top, red pitcher-plants
and chain ferns. Center,
yellow pitcher-plant.
Right, red pitcher-plant
flowers.

PHILLIP JONES

JOHN NELSON

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Above, Buffalo Creek bog at Fort Jackson, only
South Carolina site to host the endangered whorled
loosestrife, right. Inset, clubmoss.

including the presence of the endangered whorled loosestrife, which botanists believe grows in South Carolina only at this site. (This plant occurs, in the world, only on the coastal plain of the two Carolinas. In South Carolina, it was also documented during the late 1800s from a similar bog near Society Hill, but that population has apparently since declined into oblivion.)

Additional study and repeated visits made it clear that the Buffalo Creek site, situated within an impact zone, enjoyed especially frequent burns caused by exploding rounds of ammunition from nearby training. Since the first botanical foray to Buffalo Creek, the area has received considerable regional interest. For instance, the seep's resident tall lily, one with deep red flowers, has been recognized as a new species. (Its scientific name, *Lilium pyrophilum*, suggests its dependence on fire.) Staff members within the Wildlife Diversity Section of the S.C. Department of Natural

Resources now recognize the Buffalo Creek bog as one of the premier natural areas of the Midlands; Bert Pittman, senior DNR botanist, suggests that additional species previously unknown for the state may be located here. The Buffalo Creek bog is now off-limits to visitation because of the danger from



Praying mantis on blazing star, above; blazing star and boneset, right.

unexploded ordnance and as a protective measure for the endangered plants within it. Mark Dutton, a senior environmental staff specialist at Fort Jackson, continues to direct research monitoring of whorled loosestrife. As it is situated next door to the largest city in the state, Buffalo Creek seep represents a remarkable refugium of rare plants and an excellent biological “story” concerning the persistence of high-quality natural areas given the right circumstances.

These highly unusual habitats are a part of our natural landscape, and they deserve protection. You may be lucky enough to have one on your property. If so, you may want to consult a local botanist or naturalist to check things out. Who knows? It may be a one-of-a-kind place. 🐛

John Nelson is curator of the University of South Carolina's A.C. Moore Herbarium.

PHOTOS BY RON AHLE



Planting a Bog Dish Garden

Our state is awash in spring colors. Hidden in the rare mountain bogs of the Upstate to the bogs of the coastal plain are shades of yellow, pink, white and burgundy. The carnivorous plants are in bloom! Because carnivorous plants grow in nutrient-poor soil, they have adapted their leaves, stems and roots to trap insects and in some cases small animals. South Carolina has several species of these unusual plants, including the Venus' fly trap, pitcher-plant, sundew, butterwort and bladderwort.

Because of the unusual growing conditions required for these plants (not your average garden plants), they would appear difficult to grow. This is not the case. The fly trap, pitcher-plant and sundew can be container-grown easily in what is commonly called a bog dish garden. The items needed to make a dish garden are a proper container (sized for the number of plants used), sphagnum peat and coarse sand. The container should be made of plastic or ceramic, and don't forget the drainage hole. A saucer or other suitable container should be used under the bowl to maintain a level of water in the bottom of the soil mix. Equal parts of peat and sand make up the soil. Thoroughly mix and moisten the soil before placing it in the container.

Sun-loving natives, these carnivorous plants may be left outside in their dish garden throughout the year. A minimum of five hours of sun during the summer months will keep the plants vigorous and colorful. Water the dish garden as necessary to keep the soil mix wet during the growing season and moist during the winter. During hot or dry periods, this can be several times per week. Rainwater is the ideal watering solution, but water from your faucet will work if allowed to sit overnight in an open container.

Fertilizing your dish garden is unnecessary and in some instances can be harmful to the plants. They can be given live prey but are quite capable of attracting and capturing insects themselves. Viewing them capturing prey can be very rewarding; they're a natural form of pest control. 🐛

—Darwin Thomas

Darwin Thomas is an expert in bog ecology and owner of Darwin's Backyard, where the public can purchase carnivorous bog garden kits.



Venus' fly traps.

TED BORG

Carnivorous-plant Sources

Darwin's Backyard
Cullowhee, NC 28723
Bugeaters4u@aol.com

Carnivorous Bog
Garden Kits
South Carolina natives
Southeastern natives

Niche Gardens
Chapel Hill, NC 27516
www.nichegardens.com

Plants only

Plant Delight Nursery
Raleigh, NC
www.plantdelights.com

Plants only

Meadowview Botanical
Research Station
Woodford, VA 22580
www.pitcherplant.org

Plants only

Botanique
Stanardville, VA 22793
www.pitcherplant.com

Plants only

Many of South Carolina's carnivorous plants are declining in the wild, and DNR discourages collection of these plants except from reputable dealers. It is illegal to collect plants protected under the Endangered Species Act or take plants from public lands.

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